

Amendments to the Claims

Please amend Claims 1-4, 6-12, 14-15, and 19-32. Please add new Claims 33-36. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Currently amended) A variable-impedance active ankle foot orthosis comprising:
a device ~~for modulating~~ [[an]] impedance that modulates a joint stiffness or damping of an ankle joint ~~throughout~~ during [[a]] walking cycle for treating an ankle foot gait pathology.
2. (Currently amended) The device of Claim 1, wherein the device includes an actuator that modulates the ~~impedance joint stiffness~~ of the ankle joint by controlling stiffness to achieve a torsional spring control.
3. (Currently amended) The device of Claim 1, wherein the device includes an actuator that modulates the ~~impedance joint stiffness or damping~~ of the ankle joint by controlling joint stiffness, or a damping, or both to achieve a spring-damper positional control.
4. (Currently amended) The device of Claim 1, wherein the device includes an actuator that is coupled to a foot portion of the [[an]] orthosis.
5. (Previously presented) The device of Claim 1, wherein the device includes an actuator that is a series elastic actuator.
6. (Currently amended) The device of Claim 1, wherein the ~~further comprising an~~ orthosis includes with an ankle angle sensor.
7. (Currently amended) The device of Claim 1, wherein the ~~further comprising an~~ orthosis includes one or more ground reaction force sensors.

8. (Currently amended) The device of Claim 1, wherein the ~~further comprising an~~ orthosis includes with an actuator, an ankle angle sensor, one or more ground reaction force sensors, and a controller for controlling the orthosis.
9. (Currently amended) The device of Claim 1, wherein the ~~further comprising an~~ orthosis includes with a foot switch.
10. (Currently amended) The device of Claim 1, wherein the ~~further comprising an~~ orthosis is being used to treat drop foot gait.
11. (Currently amended) The device of Claim 1, wherein the ~~further comprising an~~ orthosis is being used to treat a patient having anterior muscle weakness, posterior muscle weakness, or a combination thereof.
12. (Currently amended) A device for treating an ankle foot gait pathology comprising:
 - an orthosis including an orthosis leg portion attachable to a leg of a person and an orthosis foot portion attachable to a foot of the person; and
 - an actuator configured to act on a spring to modulate ~~impedance~~ joint stiffness or damping of the ankle joint ~~throughout~~ [[a]] during walking cycle.
13. (Previously presented) The device of Claim 12, wherein the actuator adjusts stiffness of the ankle joint by controlling the spring deflection during controlled plantar flexion to minimize forefoot collisions with the ground.
14. (Currently amended) The device of Claim 12, wherein the actuator minimizes the ~~impedance~~ joint stiffness or damping during late stance.
15. (Currently amended) The device of Claim 12, wherein the actuator modulates the ankle impedance joint stiffness or damping of ~~the ankle joint by controlling joint stiffness or damping, or both to achieve~~ a spring-damper control during a swing phase.

16. (Original) The device of Claim 12, further comprising an ankle angle sensor.
17. (Original) The device of Claim 12, further comprising one or more ground reaction force sensors.
18. (Original) The device of Claim 12, further comprising a controller for controlling the orthosis.
19. (Currently amended) A method comprising modulating ~~an impedance~~ joint stiffness or damping of an ankle joint ~~throughout~~ during ~~[[a]]~~ walking cycle.
20. (Currently amended) The method of Claim 19, wherein the step of modulating the ~~impedance~~ joint stiffness or damping of the ankle joint ~~throughout the~~ during walking cycle further includes adjusting the ankle joint stiffness ~~of the ankle joint~~ during controlled plantar flexion to minimize forefoot collisions with the ground.
21. (Currently amended) The method of Claim 20, wherein the stiffness of the ankle joint is adjusted ~~to achieve~~ of a torsional spring control.
22. (Currently amended) The method of Claim 19, further comprising minimizing the ~~impedance~~ joint stiffness or damping during late stance.
23. (Currently amended) The method of Claim 19, wherein the step of modulating the ~~impedance~~ joint stiffness or damping of the ankle joint ~~throughout the~~ during walking cycle further comprises modulating ankle joint stiffness, or damping, or both of a torsional spring-damper control during a swing phase.
24. (Currently amended) A method of treating an ankle foot gait pathology using functional electrical stimulation, comprising:

applying electrical pulses to elicit muscle contractions to actively modulate ankle stiffness, or damping, or both ~~to achieve a torsional spring control during walking a stance period, and to actively modulate at least one of joint stiffness, damping or both.~~

25. (Currently amended) A variable-impedance active ankle foot orthosis comprising:
an actuator and a spring operatively linked to the actuator, the actuator modulating ~~an impedance~~ a joint stiffness or damping of an ankle joint by controlling a spring compression in response to at least two sensed parameters during ~~throughout~~ [[a]] walking ~~eyele~~, the actuator modulating the ~~impedance~~ joint stiffness or damping of the ankle joint by controlling the spring in at least ~~three~~ two different modulation phases ~~of the~~ during walking ~~eyele~~ in response to at least two sensed parameters.
26. (Currently amended) The variable-impedance active ankle foot orthosis of Claim 1, wherein the device further includes a spring linked to an actuator, wherein the actuator modulates the ~~impedance~~ joint stiffness or damping of ~~[[an]]~~ the ankle joint ~~by controlling the spring.~~
27. (Currently amended) The variable-impedance active ankle foot orthosis of Claim 26, wherein the actuator modulates the ~~impedance~~ joint stiffness of the ankle joint by controlling stiffness of a torsional spring control.
28. (Currently amended) The variable-impedance active ankle foot orthosis of Claim 27, wherein the actuator modulates the ~~impedance~~ damping of the ankle joint by controlling a ~~joint stiffness, damping or both~~ of a torsional spring-damper control.
29. (Currently amended) The method of Claim 19, further including the steps of operatively coupling a spring to an orthosis, and sensing one or more parameters of the orthosis ~~throughout the~~ during walking ~~eyele~~.

30. (Currently amended) The method of Claim 29, wherein the ~~impedance~~ joint stiffness or damping of the ankle joint is modulated by controlling the spring in response to the sensed parameters.
31. (Currently amended) A method of treating an ankle foot gait pathology using functional electrical stimulation, comprising:
applying electrical pulses to elicit muscle contractions to actively modulate ankle stiffness, ~~to achieve a torsional spring control during a stance period, and to actively modulate at least one of joint stiffness, or, damping, or both to achieve a torsional spring-damper control during a swing phase,~~ the impedance joint stiffness or damping further being modulated by controlling a spring ~~operatively connected to~~ associated with an orthosis.
32. (Currently amended) The method of Claim 19, further including the steps of operatively receiving a parameter of a forefoot force signal ~~throughout the~~ during walking cycle and modulating the ~~impedance~~ joint stiffness or damping of the ankle joint in response to the parameter.
33. (New) The method of Claim 24, wherein the electrical pulses actively modulate ankle stiffness during a stance period.
34. (New) The method of Claim 24, wherein the electrical pulses actively modulate ankle stiffness of a torsional spring control.
35. (New) The method of Claim 24, wherein the electrical pulses actively modulate at least one of joint stiffness or damping during a swing phase.
36. (New) The method of Claim 24, wherein the electrical pulses actively modulate at least one of joint stiffness or damping of a spring damper control during a swing phase.